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IS 1448-42 (1977): Methods of test for petroleum and its products, Part 42: Water reaction of aviation fuels [PCD 1: Methods of Measurement and Test for Petroleum, Petroleum Products and Lubricants]

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“Knowledge is such a treasure which cannot be stolen”

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“पुनर्पुष्ट १९९३”

IS : 1448 [P : 42] - 1977

Adopted : 11 April 1977

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Indian Standard

METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS

[P : 42]

WATER REACTION OF AVIATION FUELS

(Second Revision)

Second Reprint JUNE 1985

UDC 665·6/·7 : 665·743·3 : 543·831

(*Adapted with permission from the Joint publication ASTM D 1094-72/IP 289/74.*)

[Since IP 98/44 T has became obsolete, therefore, in this revision method B has been deleted and method A has been updated in order to align it with the latest ASTM standard. The title of the method has also been changed.]

1. SCOPE

1.1 This method covers the determination of the presence of water-miscible components in aviation gasoline and turbine fuels, and the effect of these components on the fuel-water interface.

2. SUMMARY OF METHOD

2.1 A sample of the fuel is shaken, using standardized technique, at room temperature with a phosphate buffer solution. The change in volume of the aqueous layer, the appearance of the interface, and the degree of separation of the two phases are taken as the water reaction of the fuel.

3. APPARATUS

3.1 Graduated Glass Cylinder — Glass-stoppered, 100 ml, with 1 ml graduations. The distance between the 100-ml mark and the top of the shoulder of the cylinder shall be within the range from 50 to 60 mm.

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4. REAGENTS

4.0 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960*) shall be used in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

4.1 Acetone — Technical grade (*see* IS : 170-1976†).

4.2 Glass Cleaning Solution — Saturate concentrated sulphuric acid (relative density 1·84) with potassium dichromate or sodium dichromate.

4.3 *n*-Hexane or *n*-Heptane or Petroleum Hydrocarbon Solvent (60/80) — *see* IS : 1745-1966‡.

4.4 Phosphate Buffer Solution (*p*H 7) — Dissolve 1·15 g of potassium monohydrogen phosphate, anhydrous (K_2HPO_4) and 0·47 g of potassium dihydrogen phosphate, anhydrous (KH_2PO_4) in 100 ml of water.

5. PREPARATION OF APPARATUS

5.1 Clean the graduated cylinder thoroughly before carrying out this test. Cleaning procedures found to be suitable are given in **5.1.1** and **5.1.2**.

5.1.1 Remove traces of oil from the graduated cylinder and stopper by flushing with hot tap water, brushing if necessary. Alternatively, remove all traces of oil from the graduated cylinder and stopper, using either *n*-hexane or *n*-heptane or petroleum hydrocarbon solvent (60/80). Rinse with acetone followed by tap water.

5.1.2 Immerse the cylinder and stopper in glass cleaning solution, rinse with tap water, then distilled water, and finally rinse with phosphate buffer solution and drain (*see* Note).

NOTE — Only cylinders that drain cleanly shall be used. If the cylinder does not drain cleanly (that is, without drops forming), soak it in hot glass cleaning solution for approximately 30 minutes. Rinse it with tap water, then distilled water, and finally rinse with phosphate buffer solution and drain.

6. PROCEDURE

6.1 Measure 20 ml of phosphate buffer solution at room temperature into the cylinder and record the volume to the nearest 0·5 ml. Add 80 ml, at room temperature, of the fuel to be tested and stopper the cylinder.

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*Specification for water, distilled quality (*revised*).

†Specification for acetone (*second revision*).

‡Specification for petroleum hydrocarbon solvent (*first revision*).

6.2 Shake the cylinder for exactly 2 minutes, 2 to 3 strokes per second using 15 to 25 cm stroke (*see* Note).

NOTE — Take care to avoid a swirling motion during shaking of the cylinder since swirling action tends to break any emulsion that might be formed.

6.3 Immediately place the cylinder on a vibration-free surface and allow the contents to settle undisturbed for 5 minutes.

6.4 Without picking up the cylinder, record the following, viewing against a white background with diffused light:

a) The change in volume of the aqueous layer to the nearest 0·5 ml,

b) The condition of the interface in accordance with Table 1, and

c) The degree of separation of the two phases in accordance with Table 2 (*see* Note).

NOTE — Disregard any slight cloudiness in the fuel layer which is no longer visible when viewed against a white background.

7. REPORT

7.1 The report shall include the following.

7.1.1 Change in volume of the aqueous layer to the nearest 0·5 ml.

7.1.2 Rating of the condition of the interface (*see* Table 1).

TABLE 1 INTERFACE CONDITIONS

(*Clauses* 6.4 *and* 7.1.2)

RATING	APPEARANCE
1	Clear and clean
1b	Small, clear bubbles covering not more than an estimated 50 percent of the interface and no shreds, lace, or film at the interface
2	Shred, lace, or film at interface
3	Loose lace or slight scum or both
4	Tight lace or heavy scum or both

7.1.3 Rating of the degree of separation (*see* Table 2).

TABLE 2 SEPARATION

(*Clauses* 6.4 *and* 7.1.3)

RATING	APPEARANCE
1	Complete absence of all emulsions or precipitates, or both, within either layer or upon the fuel layer
2	Same as (1), except small air bubbles or small water droplets in the fuel layer
3	Emulsions or precipitates, or both, within either layer or upon the fuel layer, or droplets, or both, in the water layer or adhering to the cylinder walls, excluding the walls above the fuel layer

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